Lesson plan

using the STEAM method of teaching.

Topic: How to build the house? Part 2.
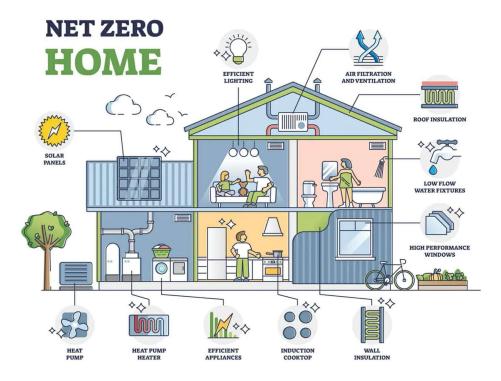
1) **What is a Zero Energy Building?**
https://www.youtube.com/watch?v=FysJKq5yCfg

What is a net zero home?

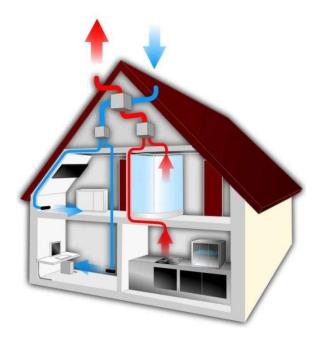**Modern solutions in a smart home**

Recuperation with heat recovery and lower heating costs

Passive houses with extremely low energy consumption are not only a matter of photovoltaic panels, but also other technologies. One of them is recuperation with heat recovery. Mechanical ventilation allows for air exchange thanks to fans that take in air from the outside and distribute it around the house, and then remove polluted air. The system is equipped with filters that ensure a pleasant microclimate inside the rooms.

Recuperation is a solution that is obligatory in energy-saving construction due to ecology and significant reduction of house operating costs. Therefore, if we are interested in low-cost passive house designs, the option of mechanical ventilation will be one of the basic requirements.

Due to modern technologies, we may wonder whether the construction of an energy-efficient house will be much more expensive than a traditional building. A very well-equipped passive house is about 30-40% more expensive to build than a traditional house. It is worth bearing in mind, however, that virtually zero operating costs will pay for themselves after 10 years.
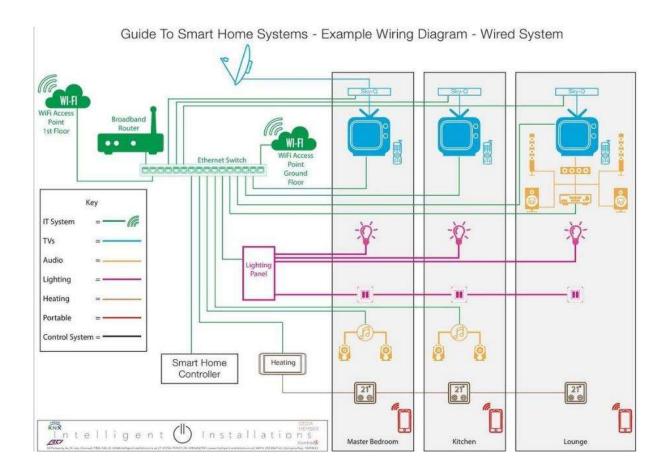
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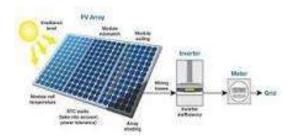**How does the intelligent system work?**

The essence of intelligent systems is the exchange and sharing of information. The same signal, e.g. from a motion sensor, can be received by many devices and simultaneously affect the operation of e.g. lighting, heating, ventilation, hot water circulation.

Guide To Smart Home Systems - Example Wiring Diagram - Wired System

At the same time, the relationship between the signal (stimulus) and the reaction to it is programmable, i.e. it can be freely modified. And at the same time, the devices operating in the house provide each other with information on the status of their operation on an ongoing basis and adapt to new conditions - if, for example, the air conditioner starts to work, the ventilation intensity decreases, if the user opens the window, the air conditioning in that room will be turned off.

2) How is photovoltaic calculated?

Globally a formula **E = A x r x H x PR** is followed to estimate the electricity generated in output of a photovoltaic system. Example : the solar panel yield of a PV module of 250 Wp with an area of 1.6 m² is 15.6% .
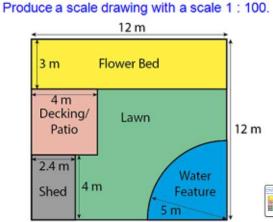
3) **Exercise – Math:**
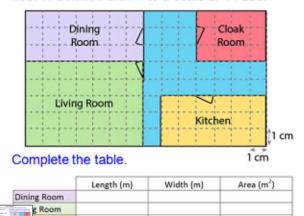   **To read well the construction plans we need to know scale drawing.**

Scale Drawings

Learning Objective: Use scale factors and scale diagrams to create drawings.

The diagram shows a rough sketch of the layout of a garden.

The diagram shows the plan of the ground floor of a house drawn to a scale of 1 : 250.

Produce a scale drawing with a scale 1 : 100.

12 m

3 m   Flower Bed

4 m
Decking/   Lawn
Patio   12 m

2.4 m
Shed   4 m   Water
               Feature
        5 m

Dining Room   Cloak Room

Living Room

Kitchen   1 cm

Complete the table.   1 cm

	Length (m)	Width (m)	Area (m^2)
Dining Room			
g Room			
en			
k Room			

An energy-saving light bulb of 18 W is connected to a voltage of 230 V. Calculate the electric current flowing through the light bulb. Calculate the electrical resistance of the bulb.

P=18W
U=230V
P=UI
I=P/U
I=0,0782A
R=U/I
R=2941 om